bls Berkeley Linguistics Society

Optimal Stress Feet in Latvian
Author(s): A. Krišjānis Kariņš
Proceedings of the Twenty-Second Annual Meeting of the Berkeley Linguistics Society: General Session and Parasession on The Role of Learnability in Grammatical Theory (1996), pp. 208-219

Please see “How to cite” in the online sidebar for full citation information.

Please contact BLS regarding any further use of this work. BLS retains copyright for both print and screen forms of the publication. BLS may be contacted via http://linguistics.berkeley.edu/bls/.

The Annual Proceedings of the Berkeley Linguistics Society is published online via eLanguage, the Linguistic Society of America's digital publishing platform.

Optimal stress feet in Latvian

A. Krišjānis Kariņš
University of Pennsylvania

1. Introduction[1]

The theoretical framework of Optimality Theory (OT), introduced by Prince & Smolensky (1991, 1993) marks a striking new approach to the study of linguistic phenomena. Since Chomsky & Halle (1968), Generative Phonology has mostly been concerned with the linguistic derivation and linguistic rules. OT introduces the idea of *constraint ranking* in the grammar of a language which allows all possible candidate forms to enter the system and be evaluated simultaneously without having a need for a derivation. An investigation of the stress pattern of Latvian provides an interesting case-study of the advantages of an OT analysis over a rule-based analysis.

Contrary to the assumption in Halle & Vergnaud (1987) and Goldsmith (1990), recent experimental work has demonstrated that the traditional grammars of Latvian are correct in asserting that Latvian has secondary stress (see Endzelīns 1922; Kariņš, 1995, 1996; Sokols *et al.* 1959). However, the stress patterns described in the traditional grammars are somewhat problematic from a rule-based perspective of metrical phonology such as that presented in Hayes (1995). The language appears to make a distinction between short words (2-3 syllables) and long words (4-5 syllables), whereby the short words build moraic trochees while the long words build syllabic trochees. The rule-based approach is thus forced to conclude that there is one set of rules which apply to the shorter words, and another set of rules which apply to the longer words. The analysis of the same data within an OT framework allows for a unified set of constraints which account for all forms in the language. However, in order for the OT analysis to hold, a "questionable" constraint needs to be posited. This raises a general question concerning what is and what is not a valid constraint to posit in the analysis of a given language.

2. The data within a rule-based parametric analysis (see Hayes 1995)

All of the data for the stress patterns of Latvian discussed below are taken from Endzelīns (1922).[2] Heavy syllables in Latvian are those with a long syllabic nucleus (long vowel or diphthong). The data in (1) show that for (short) words two or three syllables long, the language appears to build moraic trochees from left to right. The apparent exceptions to this are (1g) and (1h), which have a secondary stress on the word stem, and could thus be explained as being affected by morphological rules.

(1) Examples of stress patterns in Latvian: short words (2 - 3 syllables)
['˘ = *light syllable*, '¯ = *heavy syllable*]

a.	(má.na)	(˘ ˘)	trochee, L–>R	'my (N. fem. sg.)'
b.	(má.nas)	(˘ ˘)	trochee, L–>R	'my (N. fem. pl)'
c.	(má:).(jà:)	(-) (-)	moraic trochee, L–>R	'in the house'
d.	(á.da).ta	(˘ ˘) ˘	moraic trochee, L–>R	'needle'
e.	(á.da).(tà:m)	(˘ ˘) (-)	moraic trochee, L–>R	'for the needles'
f.	(lá).(bì:.ba)	(˘) (- ˘)	moraic trochee, L–>R	'grain'
g.	(né).(sìt)	(˘) (˘)	stressed stem	'do not hit'
h.	(né).(sì.ti)	(˘) (˘ ˘)	stressed stem	'did not hit'

For the (long) words which contain four and five syllables, the language generally builds syllabic trochees from left to right, as seen in (2) and (3). Again, (2g) and (3f-g) are exceptions to the general pattern with a secondary stress on the word stem. In addition to the syllabic trochee, (3d) and (3e) have what appears to be a pseudo-ternary pattern.

(2) Examples of stress patterns in Latvian: long words (4 syllables)

a.	(á.da).(tì.ņa)	(˘ ˘) (˘ ˘)	syll. trochee, L–>R	'little needle'
b.	(méi.te).(nì:.te)	(- ˘) (- ˘)	syll. trochee, L–>R	'little girl'
c.	(méi.te).(nì:.te:m)	(- ˘) (- -)	syll. trochee, L–>R	'for the little girls'
d.	(lá.si:).(šà.na)	(- ˘) (˘ ˘)	syll. trochee, L–>R	'the reading'
e.	(lá.si:).(tà:.ji)	(- ˘) (- ˘)	syll. trochee, L–>R	'the readers'
f.	(lá.si:).(tà:.jiem)	(- ˘) (- -)	syll. trochee, L–>R	'for the readers'
g	(pá).(è:.di).(nà:t)	(˘) (- ˘) (-)	stressed stem	'to feed'

Given the patterns in (1), the stress patterns in (2) are not expected. Whereas in (1) the language appears to build moraic trochees, the forms in (2) indicate that the language is building rhythmically alternating syllabic trochees, disregarding syllable quantity. One possible explanation could be that the heavy syllables in (2) are indeed (originally) stressed, and have simply undergone a sort of three-syllable destressing, whereby *(lá).(sì:.).(tà:.ji)* (with three consecutive stresses) would become *(lá.si:).(tà:.ji)* (with alternating stress).[3] While such an analysis is appealing, it does not account for the form (2d) *(lá.si:).(šà.na)*, which (in principle) could surface as *(lá).(sì:.ša).na* with two consecutive stresses as witnessed by (1f) *(lá).(bì:.ba)*. A process of three-syllable destressing in Latvian does not account for all of the forms in (2) via a moraic analysis. As in (1) above, the form in (2g) can be explained as a "morphological exception" to the pattern of building strict syllabic trochees.

(3) Examples of stress patterns in Latvian: long words (5 syllables)

a.	(já:.pa).(slù.di).na	(- ˘) (˘ ˘) ˘	syll. trochee, L–>R	'must announce'
b.	(áp.rau).(dzì:.da).mi	(- ˘) (- ˘) ˘	syll. trochee, L–>R	'observing'
c.	(ié.drau).(dzè:.da).(mà:s)	(- -) (- ˘) (-)	syll. trochee, L–>R	'getting acquainted'
d.	(núo.svi).li.(nà:.ta)	(- ˘) ˘ (- ˘)	"ternary" pattern	'singed'
e.	(núo.svi).li.(nà:.ta:m)	(- ˘) ˘ (- -)	"ternary" pattern	'for the singed'
f.	(pá:r).(è:.di).(nà:.ti)	(-) (- ˘) (- ˘)	stressed stem	'overfed'
g	(pá:r).(è:.di).(nà:tiem)	(-) (- ˘) (- -)	stressed stem	'for the overfed'

A simplified summary of a rule-based parametric metrical analysis of Latvian stress is shown in (4). From a rule-based perspective, the language is divided into having rules for short words different from rules for long words.

(4) a. for 2-3 syllable words: build moraic trochees L –> R
b. for 4-5 syllable words: build syllabic trochees L –> R
c. for some 5 syllable words: build a pseudo-ternary system

The analysis in (4) describes a stress pattern which is not attested in the broad typology presented in Hayes (1995). Of course, this could simply be the first such documented case. However, before the theory of parametric metrical phonology is broadened to include such an analysis, the question arises whether such a framework is the most appropriate for describing a language such as Latvian. The rule-based analysis remains segmented between one set of rules for short words, and another set of rules for long words. From the standpoint of phonological theory, a unified approach is generally preferred over a segmented approach. For this reason, I turn to an OT analysis (Prince & Smolensky 1991, 1993) to provide a unified account of the stress patterns of Latvian.

3. An OT account of Latvian stress

The undominated constraints in (5) are needed in order to account for the fact that in Latvian, the first syllable receives primary stress regardless of syllabic weight, and that rhythmic stress is alternating with the strong beat first.

(5) a. ALIGNHEAD (Head (PrWd), L; PrWd, L)
every PrWd begins with the main stress foot
b. TROCH-FT feet are trochaic

The general pattern seen in (1) - (3) above is that Latvian creates at least two feet per word whenever it can. Building upon Zeps (1989), this translates into words ideally (optimally) consisting of one colon, as shown through the constraint in (6).

(6) COLON the PrWd consists of at least one colon

This constraint helps to explain the apparent split between short and long words discussed above. Whereas long words have enough syllables to form a colon, and thus can support an alternating stress pattern, short words (having less than four syllables) resort to stressing heavy syllables in order to satisfy the COLON condition.

The constraint COLON is not undominated, as words such as *(má.na)* 'my' show. One of the additional constraints shown in (7) must be operative in the language, which would of necessity have to dominate COLON.

(7) a. FTBIN feet are binary in a syllabic or moraic analysis
(Prince & Smolensky 1993)
b. SWP, *Stress-to-Weight Principle*: every stressed syllable must be heavy

The constraint FTBIN is posited by Prince & Smolensky (1993), following earlier work by McCarthy & Prince (1986) and Prince (1985, 1990). The constraint requires simply that all feet are either bisyllabic or bimoraic. The SWP is a mirror image of the *Weight-to-Stress Principle* (Prince 1990; Prince & Smolensky 1993), which states that all heavy syllables must receive stress. It is in effect a restatement that stressed syllables are "obligatorily branching" (see for example Hayes 1995; Prince 1985 following earlier work of Halle & Vergnaud 1978 and Hayes 1981). The *Weight-to-Stress Principle* would not help to rule out a form such as **(á.da).(tà)*, since there is no heavy syllable in the word which would be affected by the constraint.

Light-syllabled words such as *(má.na)* 'my' and *(á.da.).ta* 'needle' show that if the SWP is active, it is indeed violable. Similarly, a word such as *(lá).(bì:.ba)* 'grain' indicates that if FTBIN is active, it is also violable, since the first syllable has only a light syllable.

The tableaux in (8) and (9) illustrate that both FTBIN and SWP can be ranked above COLON. In tableau (9) and elsewhere, I am not indicating a violation of the SWP on the initial syllable, since all initial syllables always receive stress by virtue of the inviolable ALIGNHEAD, and each candidate with a light first syllable will have the same SWP violation.

(8)	/a.da.ta/	FTBIN	COLON
a.	(á.da).(tà)	* !	
b. ☞	(á.da).ta		*
c.	(á).(dà.ta)	* !	

(9)	/a.da.ta/	SWP	COLON
a.	(á.da).(tà)	* !	
b. ☞	(á.da).ta		*
c.	(á).(dà.ta)	* !	

However, if FTBIN >> COLON in the tableau for *(lá.).(bì:.ba)*, the improper candidate is selected, as seen in (10). In order for the proper candidate to be selected, both SWP and COLON must dominate FTBIN, as shown in (11).

(10)	/la.bi:ba/	FTBIN	COLON
a. ☞	*(lá.bi:).ba		*
b.	(lá).(bì:.ba)	* !	
c.	(lá.bi:).(bà)	* !	

(11)	/la.bi:ba/	SWP	COLON	FTBIN
a.	(lá.bi:).ba		* !	
b. ☞	(lá).(bì:.ba)			*
c.	(lá.bi:).(bà)	* !		*

From (9) we know that SWP dominates COLON, and from (11), we know that both SWP and COLON dominate FTBIN. Through transitivity we therefore know the relative constraint ranking shown in (12).

(12) SWP >> COLON >> FTBIN

Unfortunately, the constraint ranking in (12) selects the wrong candidate in a four-syllable such as *(lá.si:).(šà.na)* 'the reading', as is shown in (13).

(13) /la.si:.ša.na/	SWP	COLON
a. (lá.si:).(šà.na)	* !	
b. ☞ *(lá).(sì:.ša).na		
c. (lá).(sì:.ša).(nà)	* !	

There are two likely constraints which could help to select the correct candidate for a form such as *(lá.si:).(šà.na)*, shown in (14). By necessity, the relevant constraint must dominate SWP, as can be seen in (13) above.

(14) a. PARSE-S every syllable must be parsed by a foot
(see Prince & Smolensky 1993)
b. *CLASH no adjacent strong beats
(see Kager 1994)

The constraint PARSE-S as discussed by Prince & Smolensky (1993) is a member of the PARSE "family" which requires all segments to be parsed into higher prosodic structure. In this instance PARSE-S requires that all syllables be parsed into the metrical structure. The constraint *CLASH is rooted in metrical grid theory, and the idea behind it is discussed in numerous places (see Halle & Vergnaud 1987; Hayes 1995; Kager 1993, 1994; Prince 1983). The idea of the constraint is rooted in the observed fact that many languages shift stress in order to avoid a potential stress clash.

In (15) we see that if PARSE-S is ranked above SWP, the correct candidate, (15b), is barred from surfacing for the word *(á.da).ta* 'needle'. In order to select the correct candidate for this word, the relative ranking must be SWP >> PARSE-S, as illustrated in (16).

(15) /a.da.ta/	PARSE-S	SWP	COLON
a. ?☞ *(á.da).(tà)		*	
b. (á.da).ta	* !		*
c. ?☞ *(á).(dà.ta)		*	

(16) /a.da.ta/	SWP	PARSE-S	COLON
a. (á.da).(tà)	* !		
b. ☞ (á.da).ta		*	*
c. (á).(dà.ta)	* !		

Although unnecessary in (16) because of COLON, (17) shows that PARSE-S (ranked below SWP) is indeed necessary in order to help select the proper candidate for a two syllable word such as *(má.nas)* 'my'.

(17)	/ma.nas/	SWP	PARSE-S	COLON
a.	(má).(nàs)	* !		
b. ☞	(má.nas)			*
c.	(má).nas		* !	*

If the constraint *CLASH, if ranked above SWP, it selects the correct candidate for the four-syllable word *(lá.si:).(šà.na)*, as seen in (18).

(18)	/la.si:.ša.na/	*CLASH	SWP	PARSE-S	COLON
a. ☞	(lá.si:).(šà.na)		*		
b.	(lá).(sì:.ša).na	* !		*	
c.	(lá).(sì:.ša).(nà)	* !	*		

Unfortunately, by having *CLASH >> SWP, the *wrong* candidate is selected for the three-syllable word *(lá).(bì:.ba)* discussed above in (11), and shown again with *CLASH in (19). Regardless of whether *CLASH were to be posited as operative on a syllabic or moraic layer, the result is the same, since whatever version selects *(lá.si:).(šà.na)* as optimal similarly wrongly excludes *(lá).(bì:.ba)*.

(19)	/la.bi:ba/	*CLASH	SWP	PARSE-S	COLON
a. ☞	*(lá.bi:).ba			*	*
b.	(lá).(bì:.ba)	* !			
c.	(lá.bi:).(bà)		* !		

Indeed, if *CLASH is operative in Latvian, it must be ranked below SWP and PARSE-S, as shown in (20).

(20)	/la.bi:ba/	SWP	PARSE-S	*CLASH	COLON
a.	(lá.bi:).ba		* !		*
b. ☞	(lá).(bì:.ba)			*	
c.	(lá.bi:).(bà)	* !			

Since we know from (20) that *CLASH must be ranked below PARSE-S and SWP, and from (11) that FTBIN must be ranked below *COLON, we know the partial constraint rankings in (21).

(21) a. SWP >> {PARSE-S, COLON} >> FTBIN
b. {SWP, PARSE-S} >> *CLASH

As seen in (22), the constraint ranking in (21) also selects the correct candidate for the pseudo-ternary pattern word *(núo.svi).li.(nà:.ta)* 'singed' from (3d) above. Where a rule-based account of the stress pattern of Latvian fails to account for these forms in a straightforward manner, an OT account succeeds. However, the set of constraints in (21) still cannot account for the stated stress pattern for *(lá.si:).(šà.na)* (see (13)).

(22)	/nuo.svi.li.na:.ta/	SWP	PARSE-S	COLON
a. ☞	(núo.svi).li.(nà:.ta)		*	
b.	(núo.svi).(lì.na:).ta	* !	*	
c.	(núo.svi).(lì.na:).(tà)	* !		

Although PARSE-S and *CLASH fail to dominate SWP in Latvian, there must be another constraint active in the language which does. Considering the forms in (23), the relevant constraint appears in some way to affect the alignment of stress feet over the duration of the word.

(23) a. (lá).(bì:.ba) (˘) (– ˘)
b. *(lá).(sì:.ša).na (˘) (– ˘) ˘
c. (lá.si:).(šà.na) (˘ –) (˘ ˘)

A possible active alignment constraint is presented in (24).[4]

(24) ALIGNEDGE feet are aligned next to the edge of the PrWd

The tableau in (25) shows that with ALIGNEDGE >> SWP, the correct candidate is selected for *(lá.si:).(šà.na).* In addition, the correct candidates for *(lá).(bì:.ba)* and *(á.da).ta* are also selected, since the surface forms do not violate ALIGNEDGE. Such an alignment constraint appears to be relevant to words four or more syllables long.

(25)	/la.si:.ša.na/	ALIGNEDGE	SWP	PARSE-S	COLON
a. ☞	(lá.si:).(šà.na)		*		
b.	(lá).(sì:.ša).na	* !		*	
c.	(lá).(sì:.ša).(nà)	* !	*		

Unfortunately, the inclusion of ALIGNEDGE >> SWP selects the incorrect candidate for (3c), as shown in (26).

(26) /ie.drau.dze:.da.ma:s/	ALIGNEDGE	SWP	PARSE-S	COLON
a. (íe.drau).(dzè:.da).(mà:s)	* !			
b. (íe.drau).(dzè:.da).ma:s	* !		*	
c. ☞ *(íe.drau).dze:.(dà.ma:s)		*	*	
d. (íe).(dràu).(dzè:.da).(mà:s)	* * !			
e. (íe).(dràu.dze:).da.(mà:s)	* !		*	

If the stress pattern of Latvian is to be accounted for with the inclusion of ALIGNEDGE (which is open to question), there must be another (undominated) constraint active in the language which rules out two adjacent unstressed moras from surfacing unfooted.

Kager (1994) provides the constraint PARSE-2, shown in (27), which constrains the metrical parse of syllables. Crucially, Kager (1994) writes that a stress unit can be either a syllable or mora.

(27) PARSE-2 one of two adjacent stress units must be parsed by a foot (Kager 1994)

With the addition of this inviolable and hence undominated constraint, the correct candidate is selected for (3c), as shown in (28).

(28) /ie.drau.dze:.da.ma:s/	PARSE -2	ALIGNEDGE	SWP	PARSE -S	COLON
a.☞ (íe.drau).(dzè:.da).(mà:s)		*			
b. (íe.drau).(dzè:.da).mà:s	* !	*		*	
c. (íe.drau).dze:.(dà.ma:s)	* !		*	*	
d. (íe).(dràu).(dzè:.da).(mà:s)		* * !			
e. (íe).(dràu.dze:).da.(mà:s)		*		* !	

The combination of ALIGNEDGE and PARSE-2 also helps to select the correct candidate in (29) below. Importantly, the illicit candidate **(núo.svi).li.(nà:).(tàm)* is ruled out by ALIGNEDGE. We know that *CLASH could not help to rule out the illicit candidate, since {SWP, PARSE-S} >> *CLASH, as seen in (20) above.

(29) /nuo.svi.li.na:.ta:m/	PARSE-2	ALIGNEDGE	SWP	PARSE-S	COLON
a. ☞ (núo.svi).li.(nà:.ta:m)				*	
b. (núo.svi).(lì.na:).ta:m	* !	*	*	*	
c. (núo.svi).li.(nà:).(tà:m)		* !			

As could be expected, all is still not clear with the constraint ALIGNEDGE. As shown in (30), *(já:.pa).(slù.di).na* 'must announce' does not align its feet at the

word edge. It also lacks a heavy syllable subject to PARSE-2. The constraints thus select the wrong candidate.

(30)	/ja:.pa.slu.di.na/	PARSE-2	ALIGNEDGE	SWP	PARSE-S	COLON
a.	(já:.pa).(slù.di).na		* !	*	*	
b. ☞	*(já:.pa).slu.(dì.na)			*	*	
c.	(já.pa).(slù.di).(nà)		* !	**		

A consideration of the forms (1g), (1h), (2g), (3f), and (3g) suggests that there is some sort of interaction between the phonology and morphology in the metrical system of Latvian. What all of these forms have in common is that the stem of the word has a stress. This suggests that there is a constraint such as that shown in (31) active in the language.

(31) ALIGN-S $[_{Stem} = [_{Foot}$ the left edge of the word stem corresponds to the left edge of a foot (see McCarthy & Prince 1993)

A quick look at all of the words with morphological prefixes in (1), (2), and (3) reveals that this constraint as stated (and ranked above PARSE-2) would force the incorrect candidate to surface for some forms. The relevant forms are listed in (32).

(32) Metrical stress patterns and morphological boundaries

	surface metrical structure	bracketed stem edge	gloss
a.	(íe.drau).(dzè:.da).(mà:s)	ie.[drau.dze:.da.ma:s	'getting acquainted'
b.	(áp.rau).(dzì:.da).mi	ap.[rau.dzi:.da.mi	'scrutinizing'
c.	(núo.svi).li.(nà:.ta)	nuo.[svi.li.na:.ta	'burned Fem. sg.
d.	(núo.svi).li.(nà:.ta:m)	nuo.[svi.li.na:.ta:m	'burned Fem. DAT pl.
e.	(já:.pa).(slù.di.).na	ja:.pa.[slu.di.na	'must advertise'
f.	(pá).(è:.di).(nà:t)	pa.[e:.di.na:t	'to feed'
g.	(pá:r).(è:.di).(nà:.ti)	pa:r.[e:.di.na:.ti	'overfed'
h.	(pá:r).(è:.di).(nà:.tiem)	pa:r.[e:.di.na:.tiem	' for the overfed'
i.	(né).(sìt)	ne.[sit	'do not hit'
j.	(né).(sì.ti)	ne.[si.ti	'did not hit'

As can be seen, forms (32a)- (32d) violate the constraint ALIGN-S, while forms (32e) - (32j) do not. Unfortunately, the traditional grammars do not provide more example forms, so any generalization drawn from these examples must remain tentative. The pattern which emerges is that some morphological prefixes are in some sense "extrametrical" (see Hayes 1995 and references therein), and hence not counted while placing rhythmic stress, while others are readily included in the metrical structure, and hence counted while placing rhythmic stress. Note that for forms (32f) - (32h), the words have (the expected) alternating stress except for the morphological prefix.

This raises a very interesting question for Latvian morphology: which morphological prefixes are visible to ALIGN-S, and which are not? This question must be pursued elsewhere. For now, I am accepting that different verbal prefixes have different degrees of incorporation into the prosodic word. Some prefixes apparently in some sense become part of the word stem and are thus subject to the regular phonological constraints, while others remain outside of the word stem, and thus leave the word open to the constraint ALIGN-S. If one accepts that the notion of "stem" is subject to both morphological and phonological conditioning, then the constraint ALIGN-S as stated appears to be undominated in Latvian.

With the addition of the undominated constraint ALIGN-S, the correct candidate for *(já:.pa).(slù.di).na* is now selected, as shown in (33) below.

(33)	/ja:.pa.slu.di.na/	ALIGN-S	ALIGNEDGE	SWP	PARSE-S	COLON
a. ☞	(já:.pa).(slù.di).na		*	*	*	
b.	(já:.pa).slu.(dì.na)	* !		*	*	
c.	(já.pa).(slù.di).(nà)		*	**!		

Although the constraint ALIGNEDGE is, as discussed, somewhat problematic; the constraints which are required to dominate it are generally motivated by the stress pattern of Latvian, as discussed above. Accepting that ALIGNEDGE is indeed part of the constraint hierarchy, Latvian has the active constraints shown in (34) which account for the rhythmic stress patterns stated in Endzelīns (1922). Although *CLASH and FTBIN can be placed in the constraint hierarchy, they do not appear to play an active role in Latvian.

(34) Undominated:
ALIGNHEAD (5a), TROCH-FT (5b), PARSE-2 (27), ALIGN-S (31)
Dominated:
ALIGNEDGE (24) >> SWP (7b) >> {PARSE-S (14a), COLON (6)}

4. Conclusion

Whereas a rule-based account of the stress pattern of Latvian is forced to separate out different metrical rules for long and short words, an OT analysis can account for all of the patterns with a unified set of constraints. However, while the OT analysis can provide a unified account of the data, it does so at the cost of having to posit the questionable constraint ALIGNEDGE (or one similar to it). The "questionable" status of this constraint is supported by the fact that the language does not have any attested forms with the stress pattern (˘ ˘) ˘ (˘ ˘). Thus, both analyses come with their own cost.

It should be noted that the "problem" with the split rule-based approach is basically rooted in the same forms as the "problem" with the OT analysis: the stress patterns in the forms *(lá).(bì:.ba)* and *(lá.si:).(šà.na)* are problematic in any analysis. In the rule-based approach, these forms (and others) lead to the conclusion that the language has one strategy for long words, and another for

short ones. In the OT analysis, these forms lead to the necessity of positing a constraint such as ALIGNEDGE.

As theoreticians, we are inclined to favor the approach which is advantageous over others. In this instance, both theoretical frameworks come with their own difficulties. However, the OT analysis does have the advantage of providing a unified account of all forms. I leave it to future research to determine whether the constraint ALIGNEDGE is justifiable in the analyses of other languages, or whether it is simply an *ad hoc* constraint allowing one to provide a unified theoretical account of the stress pattern of this language.

Endnotes

[1] Research for this article was supported in part by a grant from the International Research & Exchanges Board (IREX), with funds provided by the National Endowment for the Humanities, the United States Information Agency, and the US Department of State, which administers the Russian, Eurasian, and East European Research Program (Title VIII). I would like to thank Eugene Buckley, Anthony Kroch, Mark Liberman, and Laura Downing for helpful discussions on various aspects of this paper. All shortcomings are of course my own.

[2] For a more thorough account of the data and their presentation, see Kariņš (1996).

[3] This suggestion was put forth by Juliette Blevins (personal communication).

[4] This is perhaps not an ideal constraint. One alternative (suggested by Sean Erwin at the *BLS 22* meeting) is to posit a constraint which would not allow word-internal feet. Unfortunately, such a constraint cannot be ranked higher than the SWP, since the wrong candidate for *(íe.drau).(dzè:.da).(mà:s)* would be selected (see (26)). A second approach could be to incorporate Juliette Blevins' suggestion about three-syllable clash avoidance into an OT analysis (see above). Such an analysis would have to begin with the WSP (*Weight-to-Stress Principle*), which would need to be ranked below both *CLASH-3 and PARSE-S, as seen in the tableau (i) below. However, tableau (ii) shows that if PARSE-S is ranked above these constraints, the correct candidate (iib) *(á.da).ta* is ruled out. As discussed above, FT-BIN cannot be ranked above PARSE-S, but must be ranked below it.

(i)	/la.si:.ta:.ji/	PARSE	*CLASH-3	WSP
a.	(lá).(sì:).(tà:.ji)		* !	
b. ☞	(lá.si:).(tà:.ji)			*
c.	(lá).(sì:.ta:).ji	* !		*

(ii)	/adata/	PARSE	*CLASH-3	WSP
a.	(á.da).(tà)			
b.	(á.da).ta	*		
c.	(á).(dà.ta)			

References

Chomsky, Noam and Morris Halle. 1968. The Sound Pattern of English. New York: Harper and Row.

Endzelīns, Jānis. 1922. Lettische Grammatik. Riga: Lettischen Bildungsministerium.

Goldsmith, John A. 1990. Autosegmental & Metrical Phonology . Oxford: Basil Blackwell.

Halle, Morris and Jean-Roger Vergnaud. 1978. Metrical structures in phonology. Unpublished ms, Department of Linguistics, MIT.

Halle, Morris and Jean-Roger Vergnaud. 1987. An Essay on Stress. Cambridge, MA.: MIT Press.

Hayes, Bruce. 1981. A Metrical Theory of Stress Rules. Ph.D. dissertation, MIT (1980). [Revised version distributed by Indiana University Linguistics Club, Bloomington, and published by Garland Press, New York 1985]

Hayes, Bruce. 1995. Metrical Stress Theory: Principles and Case Studies. Chicago: The University of Chicago Press.

Kager, René. 1993. Shapes of the generalized trochee. Proceedings of the 11th West Coast Conference on Formal Linguistics, pp. 298-312.

Kager, René. 1994. Ternary rhythm in alignment theory. ms. Utrecht University.

Kariņš, A. Krišjānis. 1995. Phonetic evidence for phonological structure: Word stress in Latvian. Proceedings of the XIIIth International Congress of Phonetic Sciences. 4:642-645.

Kariņš, A. Krišjānis. 1996. The Prosodic Structure of Latvian. Ph.D. dissertation, University of Pennsylvania.

McCarthy, John J. and Alan S. Prince. 1986. Prosodic Morphology. Manuscript copy. Brandeis University and University of Massachusetts, Amherst.

McCarthy, John J. and Alan S. Prince. 1993. Prosodic Morphology I. Manuscript copy. University of Massachusetts and Rutgers University.

Prince, Alan. 1983. Relating to the grid. Linguistic Inquiry. 14:19-100.

Prince, Alan S. 1985. Improving tree theory. Berkeley Linguistics Society 11:471-490.

Prince, Alan. 1990. Quantitative consequences of rhythmic organization. CLS 26, Volume 2: The parasession on the syllable in phonetics and phonology. pp. 355-398.

Prince, Alan and Paul Smolensky. 1991. Optimality. Paper presented at the Arizona Phonology Conference IV, April 6.

Prince, Alan and Paul Smolensky. 1993. Optimality Theory. Unpublished manuscript, Rutgers University and The University of Colorado at Boulder.

Sokols, E., A. Bergmane, R. Grabis and M. Lepika (eds.) 1959. Mūsdienu latviešu literārās valodas gramatika, I: Fonētika un morfoloģija. Rīga: LPSR Zinātņu akadēmijas izdevniecība.

Zeps, Valdis J. 1989. Metrical tendencies of the Latvian folk trochee. Linguistics and Poetics of Latvian Folk Songs, ed. by V. Vīķis-Freibergs, 247-257. Kingston and Montreal: McGill-Queen's University Press.